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FREQUENTLY ASKED QUESTIONS:

1. Will the Contaminated Sediment be Disturbed and Spread by Dredging?

The issues raised in this category relate primarily to a presupposition that sediment in Wolf Lake is generally contaminated and that this contamination might be spread if sediment is dredged and used for wetland complex construction and shoreline restoration. Based on previous sediment sampling results, the USACE – Chicago District has determined that ecosystem restoration activities in Pools 6, 7, and 8 of Wolf Lake do not need to be avoided. However, contaminants in the sediment of the Wolf Lake Channel (Pool 9) were determined to be of high concern, and restoration activities were thus found to be inappropriate in this area of the lake.

To support the proposed restoration activities, additional confirmatory sediment samples were recently collected from surficial and deep depth intervals in Pools 6, 7, and 8 for chemical characterization. The concentrations of chemicals detected in the samples were evaluated to determine whether they present a potential ecological risk to benthic macroinvertebrates. To perform this evaluation, the chemical concentrations detected were screened using conservative, site-specific sediment benchmarks that are indicative of chemical concentrations with the potential to be toxic to these receptors. Sediment at a few sampling locations exhibited benchmark exceedances for metals for which significant biomagnification would not be expected, and benchmark exceedances were confined to the surficial depth interval. Sediment in the deep depth interval (sand) at all sampling locations exhibited no benchmark exceedances.

Although using the surficial sediment would not have posed a significant ecological risk, sediment (sand) in the deep depth interval in Pools 6, 7, and 8 was determined to be the most appropriate borrow material for restoration purposes. Under the selected restoration plan, borrow material would be hydraulically dredged from the deep depth interval of sediment (more than 1 foot below sediment surface) to minimize potential resuspension and transport of surficial sediment. Hence, the borrow material is not likely to increase any potential risk to ecological receptors in the lake. Instead, any such risk to ecological receptors would likely decrease because the borrow material would replace potentially contaminated surficial sediment in the areas designated for wetland complex construction and shoreline restoration. In addition, based on preliminary design activities that were conducted subsequent to the EA, only about 40 acres of the lake bottom will be dredged for borrow material (this represents about 4 percent of the total area of Wolf Lake and about 8 percent of the area of the Indiana side of Wolf Lake). Furthermore, the proposed restoration features would filter suspended nutrients and contaminants in the inflows from Pool 9, the Sheffield Avenue storm water pump station, and nonpoint sources in the watershed, further minimizing the risk to ecological receptors in the lake.

2. What are the Effects of the Project on Water Quality?

The concerns raised regarding water quality relate to suspended sediment and turbidity issues during project construction, the potential for water pollutants to be contributed by the Indiana Toll Road, and the contribution of water pollution by the industrial discharges to Pool 9 and the storm water pump station discharges to Pool 8. The proposed construction methodology is to sequentially dredge sand materials in work areas isolated with silt screens. The silt screens would be vertically suspended from the water surface to the lake bottom in order to surround and contain the work areas, thus limiting turbidity to the immediate work areas. By the time that one work area is completed and operations shift to another, suspended sediment would have settled, and water quality in the rest of the lake would be protected.

Regarding pollutant contributions from the toll road, there are a standing order from EPA and a plan for collection and treatment systems to be installed in order to eliminate uncontrolled storm water runoff from the toll road. Therefore, the toll road and any problems associated with its runoff have been excluded from the scope of the project with the understanding that these issues will be addressed by the Indiana Toll Road Authority under National Pollutant Discharge Elimination System (NPDES) permitting requirements in the near future.

In general, water quality in Wolf Lake is quite good. The existing inflows from NPDES-permitted industrial discharges have consistently complied with permit limitations. Nonetheless, construction of filtration wetlands downstream of Pool 9 and around the Pool 8 discharge zones of the two storm water pump stations would further improve water quality. In any case, the current lake inflow and outflow volumes would remain the same. Most of the water that enters Wolf Lake comes from the regulated discharges to Pools 8 and 9 and leaves the lake through Indian Creek. Equalizing the water levels in the lake and improving circulation in Pools 8, 7, and 6 would have no negative impact on water quality; in fact, water quality on the Indiana side of the lake and thus the quality of the water entering Illinois from Indiana would improve. Also, based on the hydrologic and hydraulic (H&H) analysis conducted during the restoration study, groundwater does not contribute significantly to Wolf Lake and is therefore not a consideration from a water quality standpoint.

3. Will Hydrologic Modifications Have Adverse Effects or Not Achieve Desired Results?

The H&H analysis was performed to model the response of the Wolf Lake system to major precipitation events and water levels in the various pools. In addition, the correlation between Lake Michigan and Wolf Lake water levels was thoroughly assessed as part of the H&H analysis. Currently, Pools 9 and 8 are the primary recipients of inflows to the Wolf Lake system. The only link between Pool 8 and the rest of the system is the Indiana Toll Road channel, which has been largely blocked by periodic applications of riprap to the toll road causeway; at present, the channel is partially filled with about 3 feet of material. Other bottlenecks in the system include (1) the channel connecting Pools 6 and 4 along the State Line Causeway and (2) the channel under the railroad bridge between Pools 4 and 2. Cleaning out these channels would help equalize the water levels in the pools and would prevent Pools 8, 7, and 6 from experiencing severe storm surges. Other proposed hydrologic modifications would improve water circulation within areas of Pools 6, 7, and 8 but not between the Indiana and Illinois sides of Wolf Lake. The practical effects of these modifications would include reducing the construction costs to achieve the final grades of islands; improving the chances of success of emergent and shoreline plantings; eliminating some of the stagnant zones that might suffer from oxygen depletion; and moderating storm surges in Pools 8, 7, and 6 to the extent that the base flood elevation might be lowered. To facilitate the access of dredging equipment to shallower portions of the lake, channel modifications would be made after dredging. No adverse impacts are foreseen from these hydrologic modifications.

4. What Effects Will the Project Have on Fisheries?

Concerns were expressed that the proposed project includes major changes to Wolf Lake that would eliminate fish spawning habitat and negatively affect important game fish populations and other fish species of special concern. The USACE – Chicago District firmly believes that the major change to Wolf Lake already occurred many years ago when sand was mined without regard to ecosystem impacts, slag was dumped, and the lake was cut off from Lake Michigan. Today, Wolf Lake is a eutrophic lake that is overrun by exotic invasive species within a grossly altered hydrologic regime. The premise of the proposed project is that restoration of viable native

wetland and shoreline habitat would benefit the ecosystem as a whole. It is not feasible to completely rid the lake of invasive fish species, fill in all mined areas, remove all slag, or restore the original hydrology. However, selectively restoring areas of viable native habitat such as submergent and emergent vegetation, regrading and stabilizing some of the eroded shorelines, and moderating wave action and hydrologic flux would give a competitive advantage to native fish species.

While the aquatic ecosystem restoration plan for Wolf Lake was being developed, all the organisms present were taken into account as opposed to one group. The main goal of the proposed project is to restore native vegetation to the Indiana side of Wolf Lake. Historically, Wolf Lake was actually a marshy bay of Lake Michigan that was no more than 4 feet deep and was populated by native vegetation. Fish from Lake Michigan such as lake sturgeon (*Acipenser fulvescens*), Great Lake's musky (*Esox masquinongy*), and northern pike (*Esox lucius*) depended on this bay for spawning and rearing of juveniles. These and a diverse array of other fish such as minnows (Cyprinidae), darters (Percidae), and sunfish (Centrarchidae) were permanent residents. Under the proposed plan, habitat would be restored in selected areas to a somewhat presettlement state in the form of shallow areas with emergent and submergent native vegetation. Although some portions of the lake will become shallower, this would not impede migration or staging routes for any fish that migrate from one part of the lake to another. Spawning habitat would be improved through improved (sandy) substrate and creation of more diverse and larger plots of native emergent and submergent vegetation. Habitat for spawning is vital for the survival and reproduction of native fish. Native vegetation is the key and depth is not an issue in this system.

Recent biological surveys show that Wolf Lake exhibits a moderate diversity and high abundance of game fish. However, it does have a low diversity and abundance of fish overall. Wolf Lake is an excellent put-and-take resource for the region, but it also has the potential to become a resource that is self-sustaining and ecologically improved. The proposed project is predicated on the idea that re-establishment of a self-sustaining native fishery would be superior to the current situation of a put-and-take fishery that must be maintained through human intervention on a yearly basis and whose populations of invasive species such as round gobies (*Neogobius melanostomus*) and white perch (*Morone americana*) are completely out of balance. It is possible to re-establish the native fishery by restoring the native vegetation required for all native fish species. The restoration would increase the abundance and diversity of fish that the game fishery depends on. The proposed shallow water depths are adequate because Wolf Lake was originally a shallow marsh. Deep-water zones are not the primary goal of the restoration, but they will be created as scattered holes during the borrowing of clean sand to create and restore shallower habitats of native vegetation. With the restoration of these shallower areas of native vegetation, and with the creation of adjoining diverse structure provided by the deeper holes, predator-prey interactions should balance at a point where predators become larger and forage fish become more abundant and diverse. The results should include fewer stunted fish and larger body size among species such as bluegill (*Lepomis macrochirus*) and crappie (*Pomoxis nigromaculatus*). A self-sustaining fishery would also be much more cost-effective than a put-and-take fishery.

It is interesting that species such as the northern pike and grass pickerel (*Esox americanus*) were not collected in recent surveys. The stocking of hybrid tiger muskies (*Esox lucius x E. masquigony*) might be slowly displacing native northern pike, which may eventually disappear completely because there is no means for their recolonization. Tiger muskies are more aggressive than native northern pike and displace them from preferred hunting grounds, disrupt their spawning activities, and prey on their juveniles. There is special concern about the presence of round gobies, white perch, and salmon (Salmonidae), which are all exotic species that place undue pressure on the food web of Wolf Lake. Restoring native vegetation would give native

fish a better opportunity to out-compete these invaders. Invasive fish species would not be eradicated, but their abundance should be reduced relative to desirable native species.

No decisions have been made regarding the final design of the restoration features. Input will be solicited from local groups, federal and state agencies, and the local sponsor prior to finalizing the design. The intent is to identify concerns and subsequently identify appropriate modifications that do not jeopardize the integrity of the restoration or capability to achieve the overall project goal. Such modifications can be incorporated into final design as appropriate.

5. What Effects Will the Project Have on Species of Special Concern?

Numerous comments were received regarding the potential impacts of the project on federally and state-listed species and regional species of concern, including several species of fish, amphibians, plants, and birds. Information regarding the presence of federally and state-listed species and regional species of concern at Wolf Lake was obtained from FWS, Indiana DNR, Illinois DNR, and several biological surveys recently performed in the Wolf Lake area. Protection of these species was emphasized during the planning of the proposed restoration, and protective measures were incorporated in the restoration design based on the information available. Furthermore, considerable amounts of aquatic and terrestrial habitats on the Indiana side of the lake would remain undisturbed during the project, and virtually no impacts would occur on the Illinois side of the lake.

Since the EA was prepared, additional information about the presence of federally and state-listed species and regional species of concern at Wolf Lake has been obtained from EA comments and the BioBlitz environmental inventory. These sources would be consulted during development of the final restoration design to identify any additional measures needed to minimize potential impacts on these species. In general, if knowledgeable individuals or agencies can provide specific input as to where species of concern have been observed, these species would be accommodated during the detailed design phase (through strategic timing, segregation, and phasing of work activities or through avoidance of sensitive habitat areas). Overall, in the long term, aquatic and shoreline habitats would be restored, enhanced, and diversified to achieve more natural, historical conditions that would be more suitable for the species of special concern at the site.

6. How Will the Management of Invasive Species be Accomplished?

The comments generally question the efficacy and potential impacts of the proposed management approach for controlling invasive plant species such as purple loosestrife (*Lythrum salicaria*), common reed (*Phragmites australis*), and Eurasian water milfoil (*Myriophyllum spicatum*). In addition, it was suggested and is agreed that controlled burns should be part of the management approach. After the comments were received, an expert on purple loosestrife control, Dr. Blossey of Cornell University, was consulted (he was also consulted during the project planning process). Dr. Blossey supported the proposed plan to use herbicide applications followed by introduction of beetles to control invasive species. Any introduction of beetles to areas where herbicide was applied would occur at least 1 year after herbicide application. In some areas, it would be appropriate to use either herbicide or beetles only. Furthermore, although it appears that the comments on control of common reed generally support the proposed approach, additional refinements to the approach could be made. The details of the proposed approach would be developed during preparation of final restoration plans and specifications. In all cases, herbicides would be applied by licensed applicators in strict adherence to manufacturer requirements and the requirements of regulatory agencies with jurisdiction. In addition, best

management practices would be used for the application, storage, and transport of herbicides, and herbicide treatment of the lake would be achieved with coordination with Illinois DNR. Therefore, the potential for any secondary impacts on the lake ecosystem during management of invasive species would be minimal.

Some of the shoreline and shallow, emergent areas currently containing purple loosestrife or common reed fall within the footprint of proposed shoreline enhancement or island construction activities. In these areas, the invasive species would be eliminated by construction activities and replaced with native plant communities based on a sand substrate. In those areas where purple loosestrife and common reed would not be directly eliminated by construction activities, these species would be treated with herbicide as described in the EA. When invasive species are treated during ecosystem restoration efforts, a native seed bank is often released and, with continued control of invasive species, the native community establishes a foothold. To enhance this process, a native seed mix would be spread after herbicide treatment of a given area. The key to success would be continued management in the years following the initial treatment, as stated in the EA. The sponsors of the project understand that such long-term maintenance is required. In general, the efforts to reduce and manage the existing invasive plant species would be beneficial and would not constitute adverse impacts.

7. What are the Island Construction and Shoreline Restoration Methods?

Comments were received regarding the efficacy of shoreline and island restoration efforts, especially with regard to protection from wave action and the potential for creation of habitat for invasive species through addition of rock breakwaters. Furthermore, the effects of construction on sediment and water quality were raised as issues and have been addressed in responses presented above. Suggestions were offered that geo-tubes, tire networks, or other structural wave-break devices be used. Such artificial methods were considered and were not selected for the reasons explained below. The proposed plan accounts for the wave dynamics, and a wave modeling analysis and shoreline survey were performed to support the development of wave protection measures. The primary reason that wave erosion is so severe in many portions of Pools 6, 7, and 8 is that deep water meets the shore with little or no transition through shallows. By contrast, in the areas of Pool 8 where expansive shallows exist, shoreline erosion is largely nonexistent. Therefore, after consultation with a local expert coastal consultant, it was decided to construct offshore sand shoals to intercept waves before they reach the newly constructed and revegetated shorelines. In addition, rock breakwaters that might provide habitat for invasive species such as zebra mussels (*Dreissena polymorpha*) and round gobies were not included in the selected restoration plan. The offshore sand shoals would be sacrificial and would dissipate over several years. During this period, the windward sides of the shorelines and islands most susceptible to wave action would become effectively armored with red osier dogwood (*Cornus sericea*) plantings, as observed on Scout Island and in other stable shoreline areas. The other restored shorelines and islands would be protected by windward islands or shallows that would intercept and dissipate the wave action. The orientation of the islands would either (1) help to increase water circulation in the lake through diversion or deflection or (2) be consistent with the historical beach ridge-swale formations of the areas. Conceptually, the proposed plan subscribes to the philosophy that an ecosystem restoration project should use natural, native materials to achieve its goals rather than introduce artificial structures that might have adverse aesthetic impacts, require periodic maintenance or replacement, and introduce navigational hazards.

8. Will Sourcing Seed and Plant Materials for Local Genotype be Used for the Project?

Comments were received suggesting the collection of seeds and plants from the immediate area of Wolf Lake or the use of seeds and plants from local sources for vegetation of the created islands and regraded shorelines. Given the amount of seeds necessary for the project, seed collection solely from local sources may not be possible; however, the specifications for planting and seeding would include requirements that the seeds and plants be obtained from commercial sources within a reasonable distance from Wolf Lake to preserve the integrity of local genotypes.

9. Will Recreational Access be Impacted?

Several comments expressed concern about loss of recreational access to fishing areas and about damage to restored areas by those seeking access. Although recreation is not a goal for the ecosystem restoration project, this project was developed so as to fully consider recreational access, impacts on socioeconomic values, and protection of project features.

As mentioned above, a relatively small portion of the existing shoreline would be affected by the project. Access to the primary channel in Pool 9, which is the main area of concern for shoreline fishermen, would be improved by rehabilitation of the boat ramp at the north end of Pool 9; otherwise, Pool 9 would be completely unaffected by the project. The current access to the lake via the boat launch in Pool 8 would also remain. Most of the shorelines of Pools 6, 7, and 8 would be unaffected by the project except for treatment of invasive plant species. The shoreline along the State Line Causeway (that is, the entire west shoreline of Pools 6 and 7); the south shorelines of Pools 6, 7, and 8; and most of the east shoreline of Pool 8 would be left as they are. Essentially, almost all the shoreline areas and open water areas that are currently popular for recreational activities, including fishing, boating, and windsurfing, would be left alone. Those sections of Forsythe Park adjoining the north reaches of Pool 8 where the major wetland complex would be developed are currently shallow with mucky bottoms and do not offer much recreational opportunity. The establishment of native communities and interpretive signage as well as a future walking trail system and boardwalk access points would provide enhanced and focused recreational activities superior to those currently available in this area. The shorelines of Pool 6 that would be improved by the project would no longer be accessible for shoreline fishermen. However, that loss would be small compared to the remaining accessible shoreline fishing area and the ecological improvements that would result.

Those restored areas where pedestrians or boaters are anticipated to cause adverse impacts would be protected by several design features: shrub zones in some areas would act as natural barriers; expansive shallows planted with emergents would simply be avoided by shoreline fishermen in favor of the many remaining shore locations where fishing would be easier and better; wetland islands, sand shoals, and shrub plantings would force boat-based fishermen and recreational boaters to go slowly, keep to deeper water, and stay out of newly planted wetlands; and signage or temporary artificial barriers would be constructed as necessary. Although boat-based fishermen would like a deep, straight channel running from Pool 8 to Pool 9, such a channel would completely defeat the purpose of the filtration wetlands, which is to diffuse and filter the water coming from Pool 9. A braid of meandering channels connecting Pools 8 and 9 would have ample depth for fishing boats and would have channel markers to assist navigation. In general, the recreational experience would be greatly enhanced and diversified for visitors and residents. Those limited reaches of shoreline or open water in Pools 6, 7, and 8 that would become less accessible because of the necessity to protect restored native plant communities would be more than offset by the recreational and ecosystem benefits.

10. What are the Operation and Maintenance (O&M) Requirements for the Project?

Comments were received regarding how long it would take the sediment trapping cells in the filtration wetlands to become filled with sediment and the disposal of the dredged sediment during long-term maintenance. The maintenance procedures and timeframe for removal of sediment from the sediment trapping cells would be established during the final restoration design effort. It is also understood that long-term O&M would include control of invasive species, which is essential to the success of the restoration. The City of Hammond is committed to project O&M and would use local volunteer networks and stewards to meet O&M requirements.